

## SEVERE LOCAL STORMS, JULY, 1929—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Locke, N. Y.	18	3:30 p. m.	3 mi.			Hail	Severe damage to roofs, autos, windows, and crops.	Official, U. S. Weather Bureau.
Mexico, N. Y.	18	5 p. m.				do.	Heavy loss to commercial apple crop.	Do.
Richfield, Pa.	18	P. m.				do.	Cornfields leveled, fruit trees and gardens damaged.	Do.
Milwaukee, Wis.	18					Wind	Damage mostly to trees; lake shipping delayed.	Do.
Dickinson County, Kans.	19	12:30 a. m.	3-6 mi.		150,000	Heavy hail	Heavy crop damage over path 30 miles long.	Do.
Sumter-Lee County line, S. C.	19	1:30-2:30 p. m.	880		15,000	Hail	Crops damaged over path 15 miles long.	Do.
Liberty to Easley, S. C.	19	3:30 p. m.			7,500	do.	Crops damaged.	Do.
Clayton and Crawfordville, Ga.	19					Hail and wind	Crops, trees, and roofs considerably damaged.	Do.
Fingerville, S. C.	19		2 mi.		17,500	Hail	Crops damaged over path 4 miles long.	Do.
Lake Preston, S. Dak. (near).	21	9 p. m.			4,000	Wind	A number of small farm buildings wrecked.	Do.
Osceola, Sac. and Webster Counties, Iowa.	23	P. m.				Wind and hail	Crops injured.	Do.
Stoughton, Wis. (near).	23				6,000	Wind	A farm building destroyed; minor crop damage.	Do.
Florence, Ala. (near).	24				5,000	Hail	Corn, cotton, and other crops severely injured.	Do.
Harrisburg, Pa., and vicinity.	24	P. m.				Wind, rain, and electrical.	Damage confined chiefly to power lines; 1 roof blown off.	Do.
Lancaster County, Pa. (northern).	24	P. m.			35,000	Electrical.	3 barns destroyed; livestock killed.	Do.
North Point Pleasant, W. Va.	25		83			Wind	2 buildings severely damaged.	Do.
Lamar, S. C. (near).	26	P. m.	1,800		17,500	Hail	Crops injured.	Do.
Delta, Colo.	27	6 p. m.	1,760		25,000	Hail, wind, and rain.	Destruction to crops considerable to total; poultry and livestock injured.	Do.
York Haven, Pa.	29	P. m.			30,000	Electrical.	Trolley car destroyed; 1 person hurt.	Do.
Claysville, Pa. (near).	29					Wind and electrical.	Trees uprooted; a barn destroyed; railroad tracks washed out.	Do.

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## RIVERS AND FLOODS

By R. E. SPENCER

Discussion of the Lower Mississippi flood of 1929, which was to have been published in this issue of the REVIEW, will appear as a separate paper in the August issue.

Data received too late for inclusion in last month's flood report indicate that the crest stage at Sedgwick, Kans., on the Little Arkansas River, was 18.6 feet at 9 a. m. of June 7, instead of 18.5 feet, as published; and also that the damage for the flood in which this crest occurred was \$8,640, principally to matured crops along the upper reaches of the stream.

Except for a few widely scattered, short, and disastrous floods of the summer-time type caused by excessive rains and overflows from small streams, the only rises of consequence occurring in July were those in central Kansas following the heavy rainfall over that section on July 8-9 and 11. Of these the three most destructive occurred along Cow Creek in Rice and Reno Counties, along the upper Little Arkansas River, and along the Cottonwood and upper Neosho Rivers in Marion, Chase, and Lyon Counties.

The flood along Cow Creek—the most disastrous in the State—continued from the 10th to the 19th, and its losses totaled \$3,750,000. The two largest items of this total were \$1,620,000 in matured crops and \$1,050,000 in tangible property. Hutchinson, Kans., at the confluence of Cow Creek with the Arkansas River, sustained a very large part of this latter item, the flood having been particularly damaging there. Details were of the usual character in most respects—several feet of water in the streets, 75 per cent of the city's buildings flooded, basements filled and stocks of merchandise ruined, voluntary destruction of a section of railroad grading to facilitate drainage from the city, aid from the State militia to prevent looting, successful administration of necessary sanitary measures against possible disease, and energetic rehabilitation. No lives were lost.

Along the Little Arkansas damage was comparatively small—probably not more than \$50,000. The flood began

on the 10th, reached stages exceeding or closely approaching the highest of record in the upper river, was well within its banks by the 16th, and had drained generally from farm lands before the 18th.

The effect of these two floods on the Arkansas River below Hutchinson was slight. Some unimportant overflow occurred, and at Wichita, the confluence of the Arkansas and the Little Arkansas, flood stage was exceeded by 0.8 foot.

Damage done by the floods in the upper Neosho and Cottonwood Rivers, which resulted from the same general rainfall as those in Cow Creek and the Little Arkansas, is estimated at \$866,000, chiefly to growing and matured crops, and exclusive of railroad losses. Bridges and highways were damaged to the extent of \$120,000. An outstanding stage of this flood was that of 36.3 feet at Elmdale at midnight of the 11th, the highest of record at that station.

Other Kansas rises, of less serious consequence, were those in the Smoky Hill Basin. The total loss here was estimated at \$72,750, mostly to crops in Saline County, and, to a less extent, along small streams in Ellsworth County.

The value of Weather Bureau flood warnings in Kansas is estimated at \$48,000, and an additional \$2,000,000 worth of property is said to have been saved in the Cow Creek flood (on which the Weather Bureau has no service above Hutchinson) by the advices of the county engineer.

Other floods included in the tabulation following this report were practically without consequence, except that in North Carolina the high water proved of value to logging interests.

Colorado, and to a less extent the States lying to the east and south, experienced a number of particularly disastrous flash floods during the last two decades of the month. These floods, caused by the extremely heavy and concentrated rains (the so-called "cloud-bursts") of the Rocky Mountain and Great Plains regions, are of course a familiar summer phenomenon; but their unexpectedness of occurrence, as to time and place as well as to the variety and amount of damage they are capable of doing, is a feature against which it is very

often impossible to guard. This has been especially emphasized this month, in which in practically every serious case reported, the actual damage was done by landslides, by the concentrated and torrential downrush of water from mountain slopes, or by the destructive action of small creeks suddenly converted into deep and violent streams.

Especially heavy damage was done to highways on the western slope of the Rockies. This section (and particularly that portion of it drained by the Uncompahgre River) experienced an unusual number of heavy rain-falls between July 25 and 29, resulting in numerous landslides, washouts, surface damage to land under cultivation, and, at the town of Ouray, Colo., a considerable destruction of tangible property. The greatest single instance of highway damage occurred to the Million Dollar Highway between Overton and Silverton Colo.

No adequate estimate of the losses is available, but it appears to have amounted to at least \$100,000.

Other more or less important instances of the destructive results of these floods are briefly noted below:

July 11, at El Paso, Tex.: Heavy damage to residential district by discharge from the slopes of Franklin Mountains.

July 14, in Pinoak Creek of Missouri, a tributary of the Meramec: Automobile overturned in sudden and violent overflow; 7 persons drowned.

July 15, near Tekamah, Nebr.: 5 bridges destroyed; railroad wreck due to washout; 1 death.

July 19, near Salida, Colo.: Automobile swept from highway by flood; 3 persons drowned.

July 19, near Stratton, Colo.: Railroad bridge damaged by high water in Sand Creek, resulting in train wreck; 1 sleeping car completely submerged; 9 deaths.

[All dates in July except as otherwise specified]

River and station	Flood stage	Above flood stages— dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE					
Tar:	<i>Feet</i>			<i>Feet</i>	
Tarboro, N. C. ....	18	18	18	18.0	18.
Greenville, N. C. ....	14	19	20	14.7	20.
Neuse:					
Neuse, N. C. ....	15	( <sup>1</sup> ) 15	15	16.2	June 30.
Smithfield, N. C. ....	14	( <sup>1</sup> ) 16	17	15.1	15.
				17.0	2, 3.
Santee:				14.4	16.
		( <sup>1</sup> )	5	13.9	June 29.
Rimini, S. C. ....	12	13	17	12.3	16.
		21	22	12.2	22.
		24	30	13.9	26, 27.
Ferguson, S. C. ....	12	( <sup>1</sup> ) 26	6	13.2	2, 3.
Jamestown, S. C. ....	12	5	29	12.1	27, 28.
			13	13.1	8, 9.
EAST GULF DRAINAGE					
Etowah: Canton, Ga. ....	11	31	Aug. 1	15.8	31.
MISSISSIPPI DRAINAGE					
Scioto: Larue, Ohio. ....	11	28	28	11.2	28.
Wabash:					
Covington, Ind. ....	16	7	8	16.7	8.
Mount Carmel, Ill. ....	16	12	13	16.0	12, 13.
White, West Fork:					
Elliston, Ind. ....	19	6	7	20.5	7.
Edwardsport, Ind. ....	15	10	10	19.2	10.
		5	13	17.3	8.
Mississippi:					
Angola, La. ....	45	( <sup>1</sup> )	3	52.4	June 8-13.
Baton Rouge, La. ....	35	( <sup>1</sup> )	4	43.5	June 10-13.
Donaldsonville, La. ....	28	( <sup>1</sup> )	3	34.0	June 10.
Reserve, La. ....	22	( <sup>1</sup> )	1	25.9	June 11.
New Orleans, La. ....	17	( <sup>1</sup> )	1	20.0	June 9.
Illinois:					
Peru, Ill. ....	14	2	15	15.3	9.
Havana, Ill. ....	14	2	25	17.3	17-19.
Beardstown, Ill. ....	14	( <sup>1</sup> )	30	19.6	18, 19.
Pearl, Ill. ....	12	10	27	16.2	19, 20.

<sup>1</sup> Continued from last month.

<sup>2</sup> Approximately.

River and station	Flood stage	Above flood stages— dates		Crest	
		From—	To—	Stage	Date
MISSISSIPPI DRAINAGE—continued					
	<i>Feet</i>			<i>Feet</i>	
Missouri: Waverly, Mo.-----	23	8	8	23.0	8.
Smoky Hill:					
Mentor, Kans.-----	22	12	15	24.1	15.
Solomon, Kans.-----	24	12	13	24.7	12.
Solomon: Beloit, Kans.-----	18	27	27	18.9	27.
Grand:					
Chillicothe, Mo.-----	18	7	10	26.0	9.
Brunswick, Mo.-----	12	9	9	12.4	9.
Arkansas:					
Wichita, Kans.-----	9	14	16	9.8	15.
Yancopin, Ark.-----	29	(1)	1	44.8	May 28-30
Little Arkansas:					
Sedgwick, Kans.-----	18	11	16	23.6	11.
Hellers Grove, Kans.-----	12	12	13	13.9	12.
Neosho:					
Neosho Rapids, Kans.-----	22	13	16	25.1	14.
Le Roy, Kans.-----	24	16	18	24.7	17.
Iola, Kans.-----	15	18	18	15.9	18.
Oswego, Kans.-----	17	20	20	17.0	20.
Cottonwood:					
Elmdale, Kans.-----	32	11	12	36.3	11.
Emporia, Kans.-----	20	11	16	25.5	12.
Canadian: Logan, N. Mex.-----	4			10.6	10.
Atchafalaya:					
Simmesport, La.-----	41	(1)	2	46.4	June 12-16.
Melville, La.-----	37	(1)	5	42.2	June 9-16.
WEST GULF DRAINAGE					
Guadalupe: Victoria, Tex.-----	16	6	7	22.0	6.
PACIFIC DRAINAGE					
Colorado: Parker, Ariz.-----	7	(1)	(1)	11.9	June 2.

<sup>1</sup> Continued from last month.

<sup>2</sup> Continued at end of month.

55°.5' S: 633 (73)

#### EFFECT OF WEATHER ON CROPS AND FARMING OPERATIONS, JULY, 1929

By J. B. KINCER

*General summary.*—During the first decade temperatures were rather moderate to high and growing crops made good advance generally, except in the dry Northwest, while soil moisture was sufficient from the Mississippi Valley eastward and showers were helpful in the Great Plains. The harvest of winter wheat had become general throughout the belt, but the weather was rather unfavorable for harvesting operations, with rainfall frequent and locally heavy through the central belt. Dry weather continued in the spring wheat section, except for locally beneficial showers, and rain was needed throughout the area. Moisture conditions were unfavorable west of the Rocky Mountains.

During the second decade the weather was mostly ideal for harvesting and haying in practically all parts of the country, and vegetation, on the whole, made satisfactory advance, except in the drier areas. Over the eastern half of the country rain was needed in many places, but there was no widespread, damaging drought, while in some eastern Cotton Belt sections showers were too frequent, but in many places moisture was needed, especially in the northern and more northwestern sections, as well as in most areas west of the Rocky Mountains.

During the last decade rain was needed quite generally over much of the country and especially in the Middle Atlantic States, while a general rain over the Corn Belt would have been helpful. The Northwest continued generally dry, but showers were beneficial in some central Rocky Mountain districts and the Southwest, where the range and water supply revived. Threshing and outdoor activities made excellent advance generally, except for some retardation by the extreme heat.

*Small grains.*—During the first decade there was some damage to winter wheat in parts of the Ohio Valley, but